1. Key development issues and rationale for Bank involvement

   a. Background

   Pakistan’s second Poverty Reduction Strategy Paper (PRSP-II) places a high priority on developing the energy sector, which presupposes significant investment in the sector to underpin economic growth and to pull its citizenry out of poverty. The energy sector in Pakistan is going through a difficult period characterized by shortages of electricity supply necessitating load shedding of up to a quarter of peak demand. The problems are exacerbated by the sector’s precarious financial situation precipitated by the high oil prices and lagging power tariff adjustments (none during November 2003 - February 2007 period). The problems are further compounded by shortages of natural gas, which fuels a third of the generation capacity. In 2006-07, gas-fired power plants accounted for nearly half of the electricity generated, whereas nearly a quarter was based on furnace oil. All natural gas consumed in Pakistan is indigenous, and there has been no addition to the existing reserves lately. There are significant inefficiencies in the gas distribution system, and priority is given to allocating gas to socially sensitive consumers (fertilizer production and households). The Government of Pakistan’s strategy for energy sector development; and the proposed Bank sector assistance program over the short and medium term (covered by this PCN), focuses on enhancing gas supply and make more of it available to the power sector.

   Pakistan is quite well endowed with energy resources. An estimated 54 trillion cubic feet (TCF) of gas reserves have been discovered to date, and about 32 TCF (about 900 bill. m³) remain unproduced. In 2008, domestic gas production was about 1.3 TCF (37.5 bill. m³). About 937 million barrels of oil have been discovered, of which 354 million barrels remain unproduced. The coal reserves are estimated to 185 billion tonnes, nearly all located in the Thar Desert in Sindh province. Notably, Pakistan also has a hydropower potential of about 40,000 MW, of which about 6,450 MW has been developed – the remaining economically exploitable potential is around 20,000 MW (or more as alternative fuel costs rise).
To address the electricity shortages, the government has taken steps to fast-track the development of additional power generation capacity. Two medium-sized plants of 165MW and 225 MW, owned by independent power producers (IPPs), have recently been added, and a further 450 MW (in 2 IPPs) are likely to be added in 2010. The fast-track IPP projects and new, mostly oil-fueled rental plants were expected to add about 2,000 MW of new capacity by end of 2009; however, seven of the rental plants, totaling about 1000 MW, will be delayed. Thus, load shedding is likely to continue in 2010 as well.

In view of the weak fiscal position, the government is no longer able to subsidize the power sector to the same extent as in the past, and it has (a) committed to restrict subsidies to the power sector to Rs 55 billion (US$670 million) in FY10 and to cease all operating subsidies from the subsequent fiscal year. Furthermore, the government has (b) amended the legislation to automatically (on a monthly basis) pass through to the end consumers any changes in fuel prices and also make other quarterly tariff adjustments to cover changes in non-fuel costs; (c) agreed to allocate more gas to the power sector, thereby improving efficiency and reducing cost by diminishing the need to run the oil-based power plants; (d) taken on itself the burden of public policy-induced liabilities that were earlier vested with the power companies – by assuming debts and other liabilities that the power sector companies had incurred during FYs 07-09 to finance their operations; and (e) agreed with the above finance institutions to increase electricity tariffs by overall about 26 percent in the period from October 2009 through June 2010. Power tariffs were increased by 6 percent on October 1, 2009, by 12 percent on January 1, 2010, and further 6 percent is scheduled for April 2010.

The operational and commercial performance of the public sector entities is quite low; about 25 percent of generated electricity is lost in transmission and distribution compared to an international norm of less than 15 percent. The gas transmission and distribution system is experiencing losses or Unaccounted-for Gas (UFG) of about 8 percent as compared to about 1 percent for well-run systems internationally.

To further address the challenges in the energy sector, the government has formulated an Energy Sector Development Strategy whose primary objective is to enhance the supply of energy in a sustainable manner while reducing the dependence on imported oil. The Strategy includes implementation of both policy and investment measures. On the policy side:

- Enable a financial recovery of the energy sector from large losses accumulated over several years and ensure the continued improvement of the financial viability of the sector;
- Design and implement measures to enhance gas supply to the power sector, including incentives to increase gas production from existing fields and encourage new exploration and production of natural gas; reduction of UFG; review of current priorities of natural gas use; and institution of conservation measures;
- Design and implement a social protection program that would ensure that vulnerable sections of the population would receive a minimum amount of electricity in an affordable manner;
- Promote demand-side energy efficiency measures;
- Enhance regional cooperation in energy trade as a means of diversifying energy supply and thereby increase energy security;
- Streamline the institutional setup within the government to increase the efficiency of decision making in policy formulation, planning and investments, and private sector participation; strengthen the autonomy and accountability of the sector entities which continue to be public-sector owned, especially distribution companies, and refine the industry structure to enable more private sector participation with less government guarantees, and promoting power trading.
As to investment measures to support the strategy, the government would prioritize investments that can improve efficiency in electricity and gas supply, lead to conservation of energy, and develop the country’s hydropower potential and other renewable energy. Investments to strengthen the energy grids are considered important both for reducing technical losses and providing more reliable supply. Furthermore, the government focuses on the options for electricity import from Central Asia under the Central Asia-South Asia Regional Electricity Market (CASAREM) and gas imports in the form of LNG or through pipeline projects (IPI – Iran-Pakistan-India; TAPI – Turkmenistan-Afghanistan-Pakistan-India). Also, the government supports the utilization of domestic coal sources, and likewise supports two IPP power plant projects based on imported coal.

b. Rationale for Bank Involvement

Natural gas plays a central role in power generation and industrial production and is socially critical also because it is used directly for residential consumption. Natural gas is an indigenous resource to Pakistan that is significantly cheaper than alternative sources of fuel for the power sector and for other uses, as it would replace imported oil products. Therefore, identifying ways to enhance natural gas within the existing system through enhanced gas recovery and loss reduction and to allocate freed-up gas to power generation are critical to the financial recovery of the power sector, plan for which has recently been agreed with the Bank, IMF and ADB. Beyond the cost issue, better utilization of domestic gas adds to energy security and would have environmental benefits over the current alternatives. Lack of energy in general, and of affordable electricity in particular, are major constraints to growth and poverty alleviation in Pakistan. Availability and efficient use of more domestic natural gas would help alleviating these constraints.

Upon request from the government, the Bank has looked into the gas sector and found that there are significant opportunities to improve efficiency in the way the gas sector itself is operated as well as in the way gas is made available to the power sector:

- Formal gas sales agreements (GSA) between the gas pipelines and power generation companies have not been agreed in some cases and often do not require guarantees of supply. As a result, gas deliveries to the power sector are far less than demand.
- Gas is often not supplied to the public power generation sector in accordance with priorities for natural gas usage as established by the Economic Committee of the Cabinet (ECC).
- UFG within the gas pipeline companies is considerably higher than international standards;
- Additional gas from existing licenses can be produced from tight and marginal fields if the domestic pricing policy is adjusted to compensate producers for such higher cost developments. Pricing incentives are also necessary to attract investments into new exploration and production.
- There are opportunities to improve efficiencies in gas use (water and space heating, captive power) or substitute gas with another fuel (CNG for motor fuel).

As a result of current gas use and pricing policies, the power sector is routinely undersupplied of gas. This is forcing the power system to use more fuel oil at higher costs and lower efficiency and exposing it to potentially steep oil price rises that necessitate higher electricity tariffs.

The government recognizes the need for a set of policy, regulatory, institutional, and investment actions to enhance gas production; address/reduce UFG; improve operational performance of the utilities; and conserve gas in the consuming sectors. The government is willing to undertake a thorough review of the policy framework and address issues as necessary. Sui Northern Gas Pipelines Ltd. (SNGPL) and Sui Southern Gas Company Limited (SSGC) are implementing programs to reduce gas losses in distribution. The companies are replacing 300 km of distribution lines each
year. However, at this rate, it will take in excess of 40 years to replace and/or rehabilitate all of the networks. The government is therefore looking for ways to enhance the pace of these replacement/rehabilitation programs. The gas utilities are provided a time frame for bringing down the UFG level to internationally accepted standards\(^1\), but have not been able to deliver the annual improvements.

Pakistan authorities have requested the Bank to review the proposed “Natural Gas Production Enhancement and Efficiency Project (NGPEEP)” for possible World Bank financing. No other donors/financiers are at the moment making funds available to the gas sector.

2. Proposed objective(s)

The proposed development objective is:

- Increase the availability and affordability of electricity by improving access to natural gas fuel for power generation through gas sector efficiency enhancements.

Achieving this objective would reduce the cost of Pakistan’s energy supply, positively impact energy security, and shift consumption to a more environmentally benign fuel than its alternative.

3. Preliminary description

The proposed NGPEEP would comprise design and implementation of energy sector policy, regulatory, institutional and investment measures to:

- Reduce UFG from the current levels through: (a) pipeline replacement to eliminate leakages and reduce technical losses\(^2\); and (b) modernized metering and control systems. The investment component may approximately cut UFG in half or better depending on measures taken to combat gas theft;
- Address the institutional barriers to the deployment of high efficiency appliances (space heating and/or water heating) to replace appliances which have lower thermal efficiency ratings;
- Design a gas usage optimization strategy based on a combination of national priorities and economic costs and benefits, implementation efficiency, and conservation measures. Enhance institutional capacity in petroleum sector governance, including the regulatory authority (OGRA).

The proposed Bank-financed project will be structured as a specific investment loan, tentatively in the amount of US$250 million, and is expected to be lent directly to the downstream gas companies SNGPL and SSGC with a Government of Pakistan guarantee agreement in addition to a separate loan agreement with the Government of Pakistan for the TA component. It is anticipated that each of the implementing agencies will receive an approximate equal share of the loan proceeds on the investment components. The TA component will be utilized by government entities, the Oil and Gas

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\(^1\) Oil & Gas Regulatory Authority (OGRA) has established targets – the gas companies are to reduce UFG to 4 percent by 2011. Nearer-term targets have not been met, and the 2011 target is unlikely to be met. UFG increased by more than a half percent in 2009 to an estimated 8.1 and 7.8 percent for SNGPL and SSGC, respectively.

\(^2\) The team will appraise a prioritized replacement/upgrade program and consider whether pipeline replacements in some cases should also involve capacity expansion/debottlenecking measures.
Regulatory Authority (OGRA) and the utilities. The project components as conceived at this stage are:

<table>
<thead>
<tr>
<th>Project Components</th>
<th>Indicative Bank financing (US$ m)</th>
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<tbody>
<tr>
<td>Pipeline system replacement; metering and control systems</td>
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<td>End consumers’ conservation measures (pilot)</td>
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<td>Technical assistance for capacity building and policy support</td>
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<tr>
<td><strong>TOTAL</strong></td>
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4. Safeguard policies that might apply

The task team expects environmental safeguards policies to apply. The team’s safeguard specialists will also consider whether other safeguards might apply (such as social safeguards in connection with civil works to replace natural gas pipes).

5. Tentative financing

<table>
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<td>Borrower</td>
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<td>Total</td>
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6. Contact point

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